June 23, 1953 K. F. OLDENBURG ET AL 2,642,939

PAPER TEARING MECHANISM

Filed June 12, 1950 2 Sheets-Sheet 1

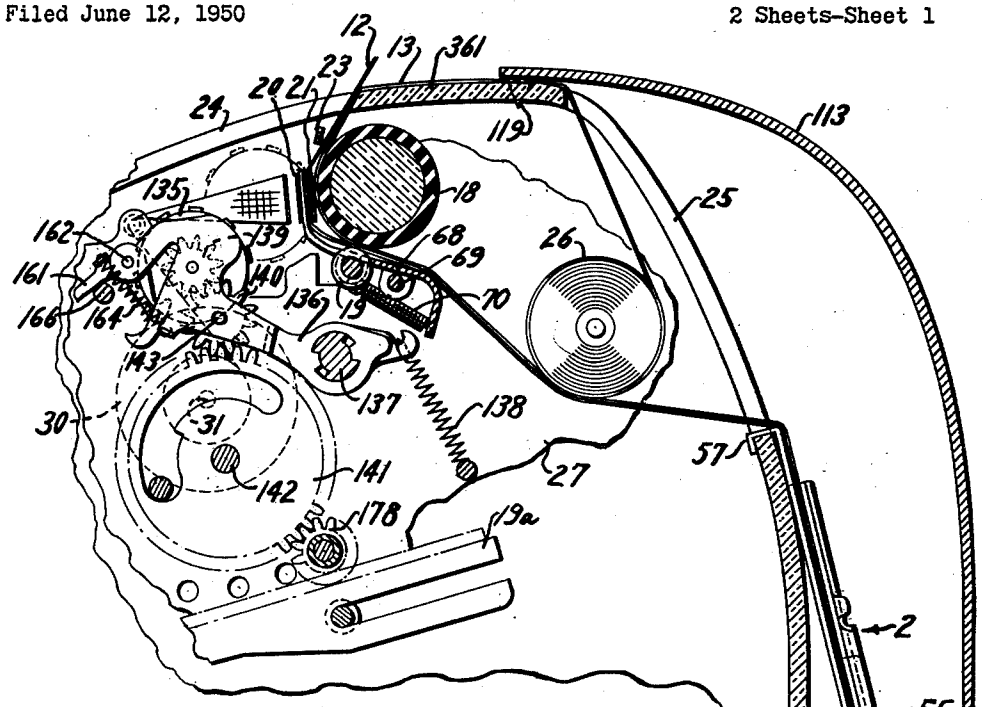


FIG. 1.

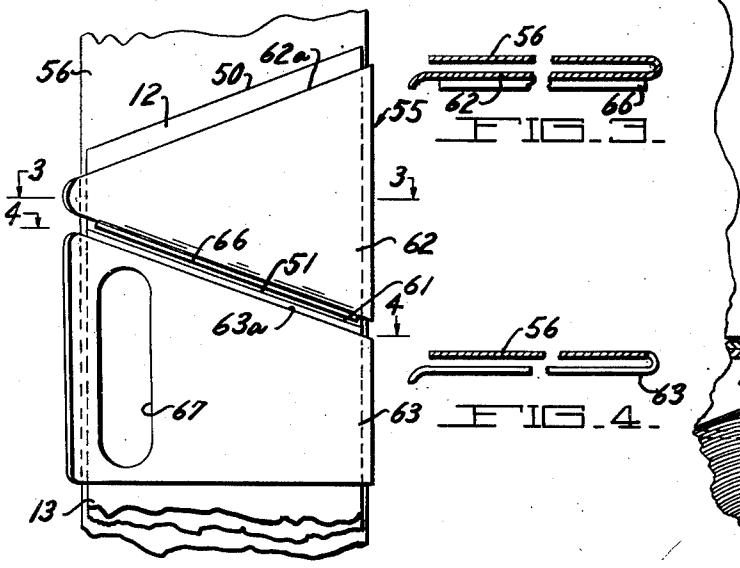


FIG. 2.

FIG. 3.

FIG. 4.

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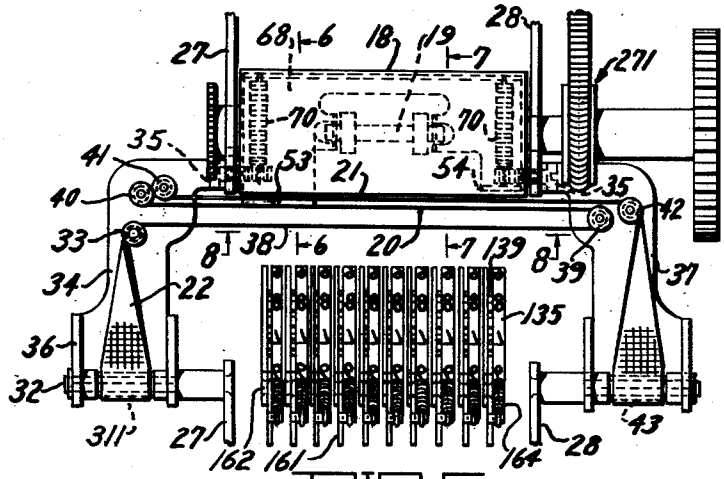


FIG. 5.



FIG. 6.

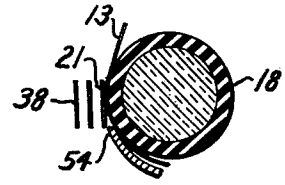
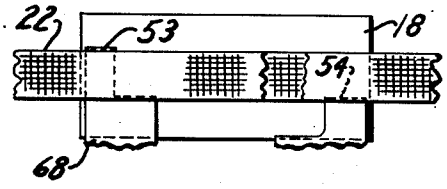


FIG. 7.



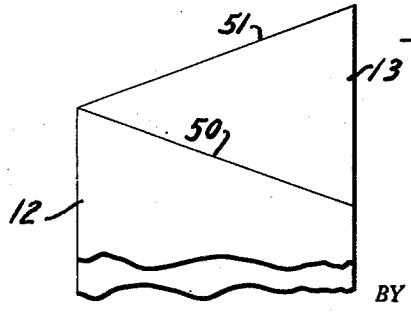


FIG. 8.

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PAPER TEARING MECHANISM

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Application June 12, 1950, Serial No. 167,598

9 Claims. (Cl. 164—84.5)

1

This invention relates to duplicate printing of characters on two or more paper strips from a common set of printing type, and has particular reference to devices capable of simultaneously printing on a plurality of paper strips using superimposed inked ribbons, one for each strip.

Such devices are used on computing listing machines such as adding and calculating machines, typewriters, etc., in order to obtain duplicate or multicate copies and in general comprise two or more separate ribbons, or separate strands of a single ribbon, separated slightly to permit the paper strips to be passed therebetween.

Athough arrangements of the foregoing type have proved satisfactory, considerable difficulty is generally encountered in installing a new supply of paper in the machine in that it is difficult to thread the leading edges of the superimposed paper strips in between and in proper relation to the printing ribbons. Consequently, various devices have been developed to either spread the ribbons apart or to insert deflectors between the ribbons, particularly during the threading operation, so as to properly guide the paper therebetween. However, those devices of which applicant is aware, are relatively complicated and difficult to use.

One of the principal objects of the present invention is to provide an improved device for threading a plurality of paper strips between a plurality of printing ribbons.

Another object is to provide a simple device, devoid of moving parts, for guiding the leading ends of a plurality of superimposed paper strips between a plurality of printing ribbons.

Another object is to properly form the leading edges of a plurality of superimposed paper strips so as to facilitate guiding these edges between printing ribbons.

A further object is to provide a simple device, devoid of moving parts, to sever the leading edges of a plurality of superimposed paper strips in different manners relative to each other.

A further object is to provide a simple and relatively inexpensive mechanism for obtaining duplicate or multiple printed copies, which mechanism might be applied to existing machines with a minimum amount of modification and expense.

The foregoing objects are accomplished in general by providing a paper severing device capable of severing the leading edges of superimposed paper strips or sheets at different angles relative to each other so as to provide pointed leading edges or tips, which tips are guided between the ribbon by a deflector plate. The deflector

2

plate is so arranged as to properly distribute the paper strips between the printing ribbons.

The manner in which the above and other objects of the invention are accomplished will be readily understood on reference to the following specification when read in conjunction with the accompanying drawings, wherein:

Fig. 1 is a sectional view through part of a cash registering machine embodying the present invention.

Fig. 2 is a rear view illustrating the paper severing device and is taken in the direction of arrow 2 in Fig. 1.

Figs. 3 and 4 are sectional plan views taken along the lines 3—3 and 4—4, respectively, in Fig. 2.

Fig. 5 is a plan view of the printing mechanism with the deflector plate associated therewith.

Figs. 6 and 7 are transverse sectional views taken along the lines 6—6 and 7—7, respectively, in Fig. 5.

Fig. 8 is a front view taken substantially along the line 8—8 of Fig. 5, showing the relationship between the paper strips, the deflector plate and the printing ribbon during the process of threading of the former through the machine.

The particular embodiment of the invention disclosed herein is applied to the well known commercially available Clary duplex cash registering machine disclosed and claimed in the copending application of V. S. Golemon, Serial No. 103,468, filed July 7, 1949.

Various instrumentalities of the machine are also disclosed and claimed in the copending applications of R. E. Boyden et al., Serial No. 38,294, filed July 12, 1948, and of R. E. Boyden, Serial No. 582,553, filed on March 13, 1945, and in Patent No. 2,472,696, issued to E. P. Drake on June 7, 1949. Accordingly, reference is hereby made to said applications and patent for a complete disclosure of a cash registering machine to which the present invention is applied. Therefore, for the sake of brevity only that mechanism which embodies the present invention and that which directly cooperates therewith will be described herein in detail.

It should be understood, however, that the invention may be equally well applied to other forms of computing and listing machines, and to other forms of printing machines, such as typewriters, check writers or the like.

The machine comprises, in general, a computing section, including a printing mechanism enclosed by a cover 361 and a cash drawer section enclosed by a cover, part of which is indicated at 11, underlying the computing section.

A rear cover 113 is removably attached to the rear of the machine to permit access to the paper tape and other parts of the machine. The latter is secured at its upper end to the cover 361 by a pair of locating pins, one of which is shown at 119, fixed thereon and fitted in openings in the cover 361.

The lower end of the cover 113 is provided with tabs, one of which is shown at 122, extending into openings in the cash drawer cover 11 and held in place by a slidable lock 180 which serves to removably lock the cover 113 in place.

Amounts entered into the machine or totaled therefrom are recorded on a pair of superimposed paper tapes or strips 12 and 13. The latter are supplied from a supply roll 15 rotatably mounted at 16 in the rear of the cash drawer section. The latter are fed in superimposed relation over a stationary guide 17 integrally mounted on the cash drawer cover 11 and extend upwardly through a combined guideway and paper severing device generally indicated at 55 to be explained later. Thence, the superimposed strips pass around a platen 18 and under a pressure roll 19 to a printing station located directly in front of the platen. Here, the inner tape 13 passes directly over the surface of platen 18 whereas the outer tape 12 passes between two strands 20 and 21 of an inked printing ribbon 22 (see also Fig. 5). Passing above the printing station, the strands are again superimposed and pass under a transversely extending paper tear-off bar 23 and into an opening 24 formed in the cover 361 of the computing section.

Suitable means (not shown) are provided to rotate the platen 18 whereby to advance the tapes upwardly during each operation of the machine and after the printing operation. To effect the proper advancement of the paper tapes during rotation of the platen the pressure roll 19 is continually spring urged against the platen or against the surface of the tapes as the latter pass over the platen. For this purpose, the roll 19 is carried by a paper guide frame 68, pivoted at 69. The frame is urged counterclockwise, as viewed in Fig. 1, a pair of springs 70 to press the superimposed strips against the periphery of the platen.

The outer tape 12 is intended to be torn off or severed over the tear-off bar 23 while the inner tape 13 is passed over the top surface of the cover 361 and into a second opening 25, in the cover and thence onto a take-up roll 26, the latter being yieldably driven from the platen through a spring belt and pulley arrangement, a part of which is generally indicated at 271 in Fig. 5.

As disclosed in detail in the aforementioned Boyden application, Serial No. 582,553, the printing mechanism comprises a series of printer type wheels 135 carried in side-by-side relation independent of each other on individual arms 136 mounted for limited pivotal movement on a printer control shaft 137. Springs 138 tend to rock the arms 136 clockwise to cause the type wheels to strike the interposed strands of printing ribbon and paper tapes at the printing station. However, the arms are normally retained in their positions shown by the shaft 137 until the printing phase of the operating cycle, at which time the shaft is rocked clockwise by suitable mechanism (not shown) to allow the printer arms 136 to follow and thus enable the type wheels 135 to print values registered thereon.

Registration of the dials is effected through the usual actuator racks 19a, each of which is

entrained with an independent pinion assembly, one of which is shown at 178, and idler gear 141, rotatably mounted on a cross shaft 142. The latter gear 141 is normally in mesh with a pinion 140, rotatably mounted at 143 on the associated printer arm 136 and maintained in permanent mesh with a gear 139 integral with the associated type wheel 135.

An aligner or detent 161 is pivoted on each arm 136 at 162 and is normally urged by a spring 164 toward detenting engagement with the gear 139. However, when the arms are held in their normal positions with the pinions 140 in mesh with idlers 141 the detents 161 are held out of engagement with gears 139 by a stationary cross rod 166.

At the printing phase, at which time the racks 19a are maintained in differentially set positions by a keyboard (not shown) or by the accumulator (not shown), the arms 136 are allowed to rock clockwise under control of the shaft 137, permitting the pinions 140 to recede from mesh with the idler gears 141. During this movement the detents 161 recede from engagement with the cross rod 166. Thus, under the action of their springs 164, the detents engage the gears 139 to align the same in proper printing position and prevent the type wheels from becoming accidentally dislocated from registry with their associated system of gears and racks 19a.

The printing mechanism is mounted in a manner not shown on a printer frame comprising a pair of spaced frame plates 27 and 28 (Figs. 1 and 5), the latter also forming bearings for the platen 18 and a support for the printing ribbon 22. The latter is fed between a pair of ribbon spools, one of which is shown in dotted lines 30 (Fig. 1) pivotally mounted on a pin 31 extending from the associated printer frame plate. Suitable means (not shown) are provided for alternately rotating one or the other of the ribbon spools so as to feed the ribbon in one direction or the other from one spool to the other.

The ribbon, as it passes from one of the ribbon spools, is guided over a roller 311 rotatably mounted on a stud 32 fixed to the printer frame plate 27. The ribbon is then guided over a second vertical roller 33 rotatably mounted on a bracket 34 which is fixed at one end thereof to the frame plate 27 by a screw 35 and is provided with apertured ears 36 at the other end thereof fitted over the stud 32. A similar plate 37 is provided on the opposite side of the printer and is similarly mounted.

The ribbon 22, upon leaving the roller 33, passes back and forth in three separate parallel strands 20, 21 and 38 along the length of the platen, being looped over a roller 39 carried by plate 37 and thence over and between a pair of rollers 40 and 41 on plate 34. The final strand 21 passes around a vertical roller 42 on the plate 37 and, after twisting 90°, is guided over a roller 43 mounted coaxially with the roller 311 and onto a second ribbon spool similar to spool 30.

It will be noted that the strands of ribbon 20 and 21 are spaced apart sufficiently to permit the paper tape 12 to pass therebetween as seen in Figs. 1 and 6. Likewise, the strand 21 is normally spaced sufficiently from the periphery of the platen 18 to permit the inner tape 13 to be passed therebetween. A somewhat greater spacing is provided between the ribbon strands 20 and 38 to permit a card, receipt slip or the like, to be inserted therebetween. Thus, duplicate recordings of an amount will be printed on the

tapes 12 and 13, and if desired a third recording can be made on a slip inserted between the ribbon strands 20 and 38 during the printing operation.

For the purpose of automatically threading the superimposed paper strips 12 and 13 in proper relation to the printing ribbon when the new supply of paper is placed in the machine, the leading edges of the strips are formed in a manner shown in Fig. 8. That is, the leading edge 50 of tape 12 is formed to incline upwardly and toward the left, whereas the leading edge 51 of tape 13 is formed to incline upwardly and to the right.

The inclined edges 50 and 51 cooperate, during threading of the tape, with the paper guide frame 68 passing thereover and between the platen and the roll 19. The guide frame terminates in a pair of spaced paper deflector portions or prongs 53 and 54. The prong 54 terminates adjacent the lower edge of the inner ribbon strand 21 but, when the guide frame 68 is held by springs 70 in position to urge the roll 19 against the paper tapes, the prong 54 curves into a position directly adjacent the periphery of the platen (see also Fig. 7). The opposite prong 53 is longer than the prong 54 and curves gradually into a vertical projection, extending intermediate the two ribbon strands 20 and 21 (see also Fig. 6).

In threading the tapes through the machine, they are first fed between the platen 18 and pressure roller 19 until the leading edges thereof, formed as at 50 and 51, extend over the guide frame 68 and between the roll 19 and the platen. Because of its inclined leading edge 51, the tape 13 will first be guided by the deflector prong 54 between the ribbon strand 21 and the platen into the position shown in Fig. 7. Thereafter, the leading edge of the tape 12 will be guided along the deflector prong 53 and between the two strands 20 and 21 as shown in Fig. 6.

Upon passing upwardly between the related ribbon strands, the tapes 12 and 13 are passed under the tear-off bar 23 and thence through the opening 24 in cover 361. The inner strand 13 is then secured upon the take-up roll 26 and the outer strand 12 remains free, permitting the same to be severed over the tear-off bar 23 whenever the occasion arises.

It will be noted that during the foregoing threading operation no intervening manipulation of the frame 68, paper tapes, printing ribbon strands, or the like is necessary in order to properly locate the paper tapes relative to the different ribbon strands.

Means are provided to properly form the leading edges of the paper tapes in the manner shown in Fig. 8 so as to facilitate the aforementioned threading of the tapes through the printing mechanism.

Referring to Figs. 1 to 4, inclusive, the superimposed tapes 12 and 13, upon passing from the supply roll 15 and over the guide 17 are guided through the combined paper severing and guide device 55. The latter is formed of sheet metal into a U-shaped guideway, one wall 56 of which has a lip 57 formed at the upper end thereof to engage over the bottom edge of the opening 25 in cover 361. The lower end of the wall element 56 has an ogee formation 58 formed therein terminating in a ledge 59 arranged to be inserted under the cover 361. One or more dimples 60 are formed in the ledge to yieldably retain the guide member in place on the cover 361. The resiliency of the ogee formation enables the guide member to be easily snapped in or out of place and to be retained in place.

The opposite wall of the guide member 55 is provided with an incline slot 61 therein, forming a pair of coextensive guide elements 62 and 63 arranged serially along the path of movement of the paper. The upper edge 63*a* of the guide element 63 forms a severing edge to effect tearing of the leading edge 51 of the tape 13 therealong. The upper edge 62*a* of the guide element 62 is formed along an incline extending oppositely to the slot 61 so as to form a severing edge for tearing the leading edge 50 of the tape 12 therealong.

In threading the paper, thle leading edges of both tapes are inserted under the lower guide element 63, preferably from the free side of this element, i. e. the left side as viewed in Fig. 2. The tape 12 which is adjacent the main wall 56 of the guide member is likewise inserted under the upper guide element 62 while the leading edge of the tape 13 is extended through the slot 61. Now, in order to form the inclined leading edges of the tapes, the lower guide element 63 is preferably pressed inward to grip both tapes in position and the upper edges of both tapes are then grasped and pulled outwardly, severing the same along the upper edges of the two guide elements 62 and 63. Thereafter, the tapes are passed upwardly under both guide elements and into the machine as previously described.

In order to insure proper feeding of the severed edge 51 of the tape 13 under the guide element 62, the lower edge of guide element 62 is provided with an outwardly curled edge 66 (see also Fig. 3) which is capable of guiding the leading edge 50 of tape 13 under the guide element 62.

In order to further facilitate guiding of the tapes under the guide element 62 and into the machine after the inclined leading edges have been formed thereon, an elongated slot 67 is formed in the guide element 63 adjacent the outer free end thereof, permitting the operator to engage the tapes with his finger extending through the slot and to move his finger therealong to accordingly feed the tapes.

Having thus described the invention, what we desire to secure by United States Letters Patent is:

1. In a listing machine having facilities for feeding superimposed paper strips to a recording device, a paper severing device for severing the leading edges of said strips in different manners relative to each other comprising a member of sheet material bent upon itself to form opposed walls of a U-shaped guideway for said strips, said guideway being arranged along the path of movement of said strips, one of said walls having a laterally extending slot therein to form a pair of guide elements arranged serially along said guideway, the edges of said guide elements nearest one end of said guideway forming paper severing edges extending across said guideway, said edges extending at an angle relative to each other, the free ends of one of said guide elements being adapted to flex toward the other of said walls whereby to clamp said paper strips between said walls, and a slot through one of said guide elements extending longitudinally of said guideway and aligned with the path of movement of said paper strips through said guideway.

2. In a listing machine having facilities for feeding superimposed paper strips to a recording device, a paper severing device for severing the leading edges of said strips in different manners relative to each other comprising a member of sheet material bent upon itself to form opposed walls of a U-shaped guideway for said strips, said

guideway being arranged along the path of movement of said strips, one of said walls having a laterally extending slot therein to form a pair of guide elements arranged serially along said guideway, the edges of said guide elements nearest one end of said guideway forming paper severing edges extending across said guideway, said edges extending at an angle relative to each other, the opposite edge of the guide element nearest said end of said guideway being flared outwardly from said guideway.

3. In a computing listing machine having facilities for feeding superimposed paper strips to a recording device, a paper severing device for severing the leading edges of said strips in different manners relative to each other comprising a member of sheet material bent upon itself to form opposed walls of a U-shaped guideway for said strips, said guideway being arranged along the path of movement of said strips, one of said walls having a laterally extending slot therein to form a pair of guide elements arranged serially along said guideway, each of said guide elements having a paper severing edge thereon extending across said guideway, said paper severing edges extending at an angle relative to each other, and the free ends of said guide elements being adapted to flex toward the other of said walls whereby to permit clamping said paper strips between said walls.

4. A paper severing device for severing the leading edges of superimposed paper strips in different manners relative to each other comprising a member of sheet material bent upon itself to form opposed walls of a U-shaped guideway for said strips, one of said walls having a laterally extending slot therein to form a pair of guide elements arranged serially along said guideway, each of said guide elements having a paper severing edge thereon extending across said guideway, the free end of at least one of said guide elements being adapted to flex toward the other of said walls whereby to permit clamping said paper strips between said walls while severing said leading edges thereof, said paper severing edges extending relative to each other to form leading tips on respective ones of said strips, said tips being located laterally of each other.

5. A paper severing device for severing the leading edges of superimposed paper strips in different manners relative to each other comprising a member of sheet material bent upon itself to form opposed walls of a U-shaped guideway for said strips, one of said walls having a laterally extending slot therein to form a pair of guide elements arranged serially along said guideway, each of said guide elements having a paper severing edge thereon extending across said guideway, said paper severing edges extending relative to each other to form leading tips on respective ones of said strips, said tips being located laterally of each other.

6. A paper severing device for severing the leading edges of superimposed paper strips in different manners relative to each other comprising a member of sheet material bent upon itself to form opposed walls of a U-shaped guideway for said strips, one of said walls having a pair of diagonally extending paper severing edges thereon for severing respective ones of said strips, said edges being arranged serially along said guideway, one of said edges extending at an angle relative to the other.

7. A paper severing device for severing the leading edges of superimposed paper strips in different manners relative to each other comprising a wall element, a pair of guide elements arranged serially along said wall element in spaced relation therewith to form a guideway for said strips, said guide elements being integral with said wall element along one edge of said guideway and being free from said wall element along the opposite edge of said guideway, each of said guide elements having a paper severing edge extending across said guideway for severing the leading edge of a respective one of said strips, said paper severing edges extending relative to each other to form leading tips on respective ones of said strips, said tips being located laterally of each other.

8. A paper severing device for severing the leading edges of superimposed paper strips in different manners relative to each other comprising means forming a guideway for said strips, one of the walls of said guideway comprising two guide elements, each of said guide elements having a paper severing edge extending across said guideway, said paper severing edges extending relative to each other to form diagonally extending leading edges on said strips, one of said leading edges extending oppositely of the other.

9. A paper severing device for severing the leading edges of superimposed paper strips in different manners relative to each other comprising a wall element, a pair of guide elements integral with said wall element and arranged serially therealong, said guide elements being spaced from said wall element to form a guideway for said strips, each of said guide elements having a paper severing edge extending across said guideway, said paper severing edges extending relative to each other to form diagonally extending leading edges on said strips, one of said leading edges extending oppositely of the other.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,965,578	Colquhoun	July 10, 1934
2,362,641	Krueger	Nov. 14, 1944
2,434,776	Van Cleef et al.	Jan. 20, 1948
2,495,389	Sammann	Jan. 24, 1950
2,528,958	Johnson	Nov. 7, 1950